

**Supplemental Information
to the
Programmatic Biological Assessment
for the
Revised Land and Resource Management Plan
Daniel Boone National Forest**

**Effects on the Indiana Bat Resulting From
Green Tree Cutting Activities on the
Daniel Boone National Forest**

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I. Proposed Action

Management Actions Associated with Green Tree Timber Harvest

Cutting green trees is a tool that will be utilized to attain some of the desired future conditions across the forest. Some of the green trees will have desirable physical characteristics making them suitable for roosting Indiana bats. This green tree cutting will occur across the forest (ref: appendix H, Revised Forest Plan) on up to 4,500 acres annually. It is realized that this level of harvest may not occur every year. Because of other programmatic limitations (e.g., seasonal restrictions for the use of heavy equipment), up to 4,000 acres of harvest is anticipated to occur outside of the winter hibernation period. Thus, green tree cutting operations will occur during the time of year that Indiana bats are utilizing trees within the forest as roosts. A green tree harvest is initiated by a management decision to implement a silvicultural prescription for a timber harvest. Detailed discussion of the silvicultural prescriptions and under what conditions they will be applied is found in Appendix H of the Land and Recourse Management Plan Daniel Boone National Forest. The excerpted table below describes vegetation management practices involving green tree sales by forest type.

Table H - Vegetation management practices on the Daniel Boone National Forest, by forest type group and two non-forest conditions

Vegetation Management Practice Description	Dry Xeric & Dry –Mesic Oak-Hickory	Yellow Pine & Yellow Pine-Hardwood	Oak-Pine	Mixed Mesophytic	White Pine & Hemlock	Grass-Shrub Opening	Road & Utility Right of Ways
Even-aged systems							
Shelterwood	X	X	X	X	X		
Clearcut	X	X	X	X	X		
Seed Tree		X	X		X		
Two-aged systems							
Shelterwood w. Reserves	X	X	X	X	X		
Seed Tree w. Reserves		X	X		X		
Uneven-aged systems							
Singletree selection	X	X	X	X	X		
Group selection	X	X	X	X	X		

The Revised Forest Plan allows for approximately 90 percent of the regeneration harvest involving green tree cutting activity to utilize the two-aged silvicultural system described below as it appears in Appendix H of the Forest Plan (Taylor, personal communication). The remaining 10 percent of the harvests will utilize the other methods identified above, but all harvests will include the suite of programmatic measures contained in the Forest Plan to avoid and minimize impacts to Indiana bats as described in this document.

Two-aged silvicultural system: *This system is likely to be the most commonly applied on suitable timberland. The reserve trees left in this system would be expected to grow and survive to the end of the next harvest entry, so that two cohorts (each having trees of similar age) would be present at all times. Data for growth and yield of two-aged stands*

is still being collected, but 20-year observations indicate that where the residual overstory is low, understory development is similar to that in clearcuts (Beck 1986).

- 1) ***Shelterwood with reserves*** - Shelter and shade would be provided for a new age-class developing in a moderated microenvironment. The shelterwood trees would be left to develop beyond physiological maturity through the “second” rotation. If available, certain reserve trees would be left for Indiana bat habitat. Artificial regeneration may be used to initiate or supplement the development of the younger cohort.
- 2) ***Seed tree with reserves*** – Reserves would provide both long-term structure as well as an initial seed source. Stand development would proceed in a similar manner as in the shelterwood with reserves method; however, initiation of the younger cohort would be from the seed trees.

Green tree timber harvest is typically comprised of the following activities, which together, make up a logging operation: administration, felling, skidding, decking, loading, and hauling of timber products from the sale area.

Timber Appraisal, Advertisement, Bidding, Award of Sale, and Closing the Sale

These actions are administrative in nature and occur in an office setting.

Sale Area Layout/Designation Of Timber To Be Harvested

In a field situation, a crew of 3-5 persons will mark the harvest area boundaries; take periodic measurements; apply small amounts of paint to the stumps and the bole of designated trees; and record data on the species and number of trees that will be harvested.

Felling

The intentional cutting down of a tree is usually done with a gasoline-powered chain saw, and aided by felling wedges and cables with block and tackle rigs. Though rarely used, other methods may include (but not limited to) feller bunchers, sheers, handsaws and/or pushing. The precise method of felling is determined during the project design and may be subject to site-specific analysis.

Skidding

The movement of logs, by dragging, from stump to a log landing is typically done using rubber-tire heavy equipment. Though rarely used, other methods may include (but not limited to) tracked vehicles, livestock, and helicopters. The precise method and location of skid trails is determined during the project design and may be subject to site-specific analysis.

Decking/Landing Area

Areas where logs are yarded or skidded for loading onto trucks for transport are generally cleared and are accessible by roads. The exact number, location and size are determined during the project design and may be subject to site-specific analysis.

Transporting Logs

Some type of temporary road is often needed to get a log truck to the decking/landing areas. The exact number, location, distance, and road standard is determined during the project design and may be subject to site-specific analysis.

Typical Green Tree Harvest in a Two-Aged Shelterwood Silvicultural System

Three of the eleven recent green trees sales on the DBNF were randomly selected and information regarding numbers of trees harvested per acre, by species, was used as the basis to characterize a typical Green Tree Timber Harvest. All of these projects were carried out under the existing Forest Plan, however specific standards relating to the management of Indiana bat habitat, thru the SHNS Amendment, are similar to that being proposed in the Revised Forest Plan. One major difference between the two forest plans is that the former is driven by output volume of timber whereas the Revised Forest Plan is driven by the attainment of Prescription Area Desired Future Conditions. While the purpose and need of a specific green tree sale are different, the actual site-specific result regarding the types and numbers of trees that are cut is expected to be similar. Thus, this data should provide a good characterization of what tree-cutting activities will generally look like under the Revised Forest Plan.

The information in Table 1 reflects the average number of tree species harvested per acre on three timber sales (Pretty Ridge, Sexton Creek and Picket) involving a total of 12 cutting units ranging in size from 7 to 38 acres. Average size of cutting units was 23 acres and Forest Plan Standards (both existing and revised) limit cutting units to a maximum size of 40 acres. This data does not reflect additional number of trees that are cut and sold within the cutting unit boundary as the result of creating log landings, skid trails and temporary roads. The specific locations for these actions are site specific and undergo analysis at the project level. However, some general guidelines can be established on an average size cutting unit basis. The average size of a cutting unit is anticipated to be about 25 acres. Within the cutting unit boundary, that is within the average 25 acre area, one or two log landings will be created. These landings will usually range in size between $\frac{1}{4}$ and $\frac{1}{2}$ acre each. Programmatically, skid trails and temporary roads are designed to avoid the additional cutting of timber, thus no or very few additional trees are anticipated to be cut as a result of skid trail and/or temporary road construction. It is estimated that up to one additional timber tree per acre of cutting unit, on average, is removed over and above that reflected in the data in Table 1 (Kluempke, personal communication) as a result of the creation of log landings within the cutting units.

Green tree pine harvest is low in these sales and will continue to be very low throughout the Revised Forest Plan planning period (10-15 years). This low level of pine harvest is

due to the recent southern pine beetle outbreak that killed most of the pine trees on the DBNF.

Table 1. Typical green tree harvest by species per acre on the DBNF.

Species Harvested	Average Number of Trees Harvested per Acre	Species Harvested	Average Number of Trees Harvested per Acre	Species Harvested	Average Number of Trees Harvested per Acre
Shortleaf Pine	1.24	Beech	0.28	Scarlet Oak	2.94
Pitch Pine	0.01	White Ash	0.24	Chinquapin Oak	0.11
Virginia Pine	0.03	Black Walnut	0.03	Chestnut Oak	3.30
Hemlock	0.07	Yellow -poplar	2.61	Northern Red Oak	2.63
Red Maple	0.24	Cucumber Tree	0.20	Black Oak	5.83
Sugar Maple	0.44	Blackgum (Highland)	0.16	Basswood	0.02
Hickory	0	White Oak	5.53	Elm	2.08

II. Forest-wide Programmatic Effects of Green Tree Cutting Activities

The specific actions associated with the cutting and sale of forest overstory trees have been outlined in the first section of this supplemental BA. Actions specifically associated with the felling of a green tree and other possible actions connected thereto, are appropriate to be considered at this programmatic level for the Indiana bat.

In order to gain a programmatic, forest-wide perspective of green tree sales that could potentially occur on an annual basis on the DBNF, the data from Table 1 was extrapolated to cover 4,000 acres. This information is presented in Table 2. It represents a programmatic estimate of the total acres (by tree species) that could be cut during site-specific, project level implementation of Forest Plan direction. The Revised Forest Plan provides for up to this amount of green tree cutting activity to occur during the time of year in which Indiana bats are roosting in trees. Thus, in an average timber harvest, about 89 percent of the commercial trees that are cut are also potential roost trees for the Indiana bat.

Potential roost trees are defined in the Revised Forest Plan as:

In two-aged shelterwood silvicultural treatments a potential roost trees is any live tree of the species listed below that is equal to or greater than 9 inches DBH.

<i>Acer rubrum</i> (red maple)	<i>Fraxinus pennsylvanica</i> (green ash)	<i>Quercus imbricaria</i> (shingle oak)
<i>Acer saccharinum</i> (silver maple)	<i>Liriodendrum tulipifera</i> (tulip tree)	<i>Quercus prinus</i> (chestnut oak)
<i>Acer saccharum</i> (sugar maple)	<i>Nyssa sylvatica</i> (blackgum)	<i>Quercus rubra</i> (northern red oak)
<i>Carya cordiformis</i> (bitternut hick.)	<i>Oxydendrum arboreum</i> (sourwood)	<i>Quercus stellata</i> (post oak)
<i>Carya glabra</i> (pignut hickory)	<i>Pinus echinata</i> (shortleaf pine)	<i>Quercus velutina</i> (black oak)
<i>Carya laciniosa</i> (shellbark hick.)	<i>Pinus rigida</i> (pitch pine)	<i>Robinia pseudoacacia</i> (black locust)
<i>Carya ovalis</i> (red hickory)	<i>Pinus virginiana</i> (Virginia pine)	<i>Sassafras albidum</i> (sassafras)
<i>Carya ovata</i> (shagbark hickory)	<i>Platanus occidentalis</i> (sycamore)	<i>Ulmus americana</i> (American elm)
<i>Carya</i> spp. (other hickories)	<i>Populus deltoides</i> (east. cottonwood)	<i>Ulmus rubra</i> (slippery elm)
<i>Fagus grandifolia</i> (Am. beech)	<i>Quercus alba</i> (white oak)	
<i>Fraxinus americana</i> (white ash)	<i>Quercus coccinea</i> (scarlet oak)	

It should be noted that potential roost trees are retained within a two-age shelterwood cut area at the rate of 10 to 15 square feet of basal area per acre (DB-WLD-4). Also retained within the project area are all immediate roost trees equal to or greater than 6 inches dbh (DB-WLD-7).

Immediate roost trees are defined in the Revised Forest Plan as:

A live tree of any dbh, having one or more characteristics that make it immediately available for Indiana bat roosting. Characteristics include sloughing bark, or cavities with openings to the outside, e.g., large splits or cracks in the bole, large broken limbs, or lightning scars. See also currently suitable roost tree and potential roost tree.

Thus, while tree-harvesting activities will remove potential roost trees, many of these same species of trees are retained within the project area for the benefit of the Indiana bat and other species. In addition, all snags greater than 6 inches dbh (DB-WLD-1) are retained and all immediate roost trees as defined above are retained within the project area.

This information is presented as an estimate only. Objectives of any, or the sum of several, individual projects could change the distribution of tree species or their percentage of the total harvest. For example, the southern pine beetle epidemic has mostly eliminated the opportunity to do much, if any, green pine tree cutting during the life of the Revised Forest Plan. Hence, the actual number of pine trees that will be cut is likely to be lower than that estimated in Table 2. It is also likely that some species not included in Table 2 will be cut as part of green tree sales. However, this estimate does provide a programmatic look, based on previous projects, at what we generally expect green tree sales to look like during the coming years.

Table 2. Estimated annual green tree harvest per year on 4000 acres of the DBNF.

Anticipated Species Harvested	Anticipated Number of Trees to be Harvested	Anticipated % of Total Trees Harvested	Anticipated Species Harvested	Anticipated Number of Trees to be Harvested	Anticipated % of Total Trees Harvested
Shortleaf Pine*	4,964	4.4%	Cucumber Tree	791	0.7%
Pitch Pine*	29	Less than 0.01 %	Blackgum* (Highland)	633	0.6%
Virginia Pine*	115	0.1%	White Oak*	22,101	19.8%
Hemlock	273	0.2%	Scarlet Oak*	11,741	10.5%
Red Maple*	964	0.9%	Chinquapin Oak	446	0.4%
Sugar Maple*	1,741	1.6%	Chestnut Oak*	13,194	11.8%
Hickory*	0	0%	Northern Red Oak*	10,518	9.4%
Beech*	1,122	1.0%	Black Oak*	23,309	20.8%
White Ash*	964	0.9%	Basswood	86	0.1%
Black Walnut	101	0.1%	Elm*	8,331	7.4%
Yellow -poplar	10,446	9.3%			

* Identified as potential roost trees in the revised forest plan

III. Analysis of Effects of the Interdependent and Interrelated Actions Associated with Green Tree Timber Sales on the Indiana Bat

Direct and Indirect Effects

During the non-hibernation season Indiana bats, especially females, often roost in live trees with naturally exfoliating bark (e.g. White oaks). These trees are defined as Potential Roost Trees in the Revised Forest Plan and are indicated by an * in Table 2. Thirteen out of twenty trees species commonly harvested on the DBNF are Potential Roost Trees.

Timber Appraisal, Advertisement, Bidding, Award Of Sale and Closing the Sale

These associated activities are administrative in nature and would have no direct or indirect effect on Indiana bats.

Sale Area Layout/Designation of Timber to be Harvested

No direct effects are anticipated. However, taking measurements with a diameter tape and/or testing for soundness with a hand ax may indirectly disturb a roosting Indiana bat, thus, impairing its normal behavioral pattern. Roosting Indiana bats can be flushed from trees within a green tree harvest unit. The noise associated with human presence in the area may cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to male or female Indiana bats roosting in trees in the area.

Felling

Regardless of the felling method used, either through dropping or accidental damage to an adjacent tree, the direct effects to the Indiana bat are the same. Assuming the bat remained in the tree, it could be harmed or killed when the tree strikes the ground. While male bats can fly away from a tree during the felling process, females seem much less likely to leave if they have flightless young present. Flightless young in a maternity colony would not have the opportunity to leave their roost tree and would likely be killed. Once the young bats become volant their likelihood of surviving the felling of a tree in which they are roosting increases substantially. Project level monitoring on the DBNF indicates that there is no known occurrence of Indiana bat mortality associated with the felling of trees.

Indirect effects are the same, regardless of the felling method used; disturbing a roosting Indiana bat may alter its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the chain saw operation. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the

Indiana bat due to the low probability that an individual tree would be felled that would contain one or more Indiana bats.

Skidding

Regardless of the skidding method used, the direct affects to the Indiana bat are the same; it could result in take of an Indiana bat that survived the felling operation and remained in the log. The skidder and/or trailing log may also accidentally knock down a non-target tree that may take an Indiana bat.

Indirect effects are in the form of disturbance; disturbing a roosting Indiana bat may change its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the running of skidders. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

Decking/Landing

Regardless of the number, location and size of the decking/landing areas, the direct effects to the Indiana bat are the same; it may result in a take when the area is cleared, logs are skidded, and/or loaded onto a transport truck.

Because of concentrated activities, indirect effects in the form of disturbance may be initially greater around decks and landing. As stated previously, disturbing a roosting Indiana bat may modify its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the running of loading equipment and log trucks. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

Transporting Logs

Regardless of the number, location, distance, and standard of temporary roads, the direct effects to the Indiana bat are the same; it may result in a take when trees are felled during road construction.

Indirectly, the movement and noise of trucks may disturb a roosting Indiana bat, thus altering its normal behavioral pattern. The noise or disturbance is generated by a variety of activities ranging from human presence in the area to the loud noises associated with the log trucks. Noise associated with activities within a cutting unit can cause a bat to flush. This flushing activity could result in harm or harassment of the Indiana bat by altering its normal behavior pattern and possibly making it more susceptible to various

predators during the daylight hours or result in mortality. While this type of disturbance can occur, it is believed to present a very minimal risk to the Indiana bat.

During the planned felling of green trees two other incidental actions could occur resulting in direct and/or indirect effects to Indiana bats. The wrong trees could be cut or the selected tree could, in the process of falling, accidentally knock down a tree that was not intended for felling. The DBNF has documented this accidental felling for the last four years. The actual number of trees that have been accidentally felled incidental to the logging operations are given in the section below. Inspection of these trees has determined that no known harm to an Indiana bat has occurred.

During the removal operations (skidding, decking, and transporting) of green trees from the project area, other trees may be accidentally knocked down. For example, trees not designated for removal as part of a planned action could be accidentally knocked over by skidders or other logging equipment operating in the area. During the last four years (2000 – 2003) monitoring data indicates that between 1 and 17 reportable roost trees are accidentally felled on an annual basis. These accidents could result in direct and/or indirect effects to Indiana bats utilizing these trees as roosting habitat.

The Forest Plan contains no programmatic prohibitions prohibiting the cutting of green trees between 1 April and 15 September, thus, programmatically this action may directly and/or indirectly affect the Indiana bat on 4,000 acres of anticipated annual tree felling activity.

Cumulative Effects to the Indiana Bat

Cumulative effects are those effects of future State, local, or private actions that are reasonably certain to occur within the action area of the DBNF. This programmatic BA addresses only those activities that are authorized by the Revised Forest Plan on lands that are under the jurisdiction of the U.S.D.A. Forest Service. Thus, any future State, local, or private actions that could potentially occur on the DBNF would require a permit from the Forest Service and will require compliance with the consultation provisions of Section 7 of the ESA as a second level, site-specific analysis of an individual project. There are no additional State, local or private actions reasonably certain to occur that result in green tree harvest on the DBNF. Therefore, cumulative effects, as defined by the ESA, will not occur.

Interrelated and Interdependent Effects on the Indiana Bat

Activities associated with projects designed to remove green trees from the forest canopy are listed in the first section of this supplement. The likelihood of any or all of these actions being used depends on the site-specific conditions and needs associated with a specific project. Individual Indiana bats have been found roosting in trees within active timber harvest projects (MacGregor, personal communication). Thus, even active sales, with all kinds of potential disturbance activities, may still serve as suitable roosting habitat for the Indiana bat. From a project level, site-specific standpoint actions other

than the felling of green trees can be designed into a project in such a way so that Indiana bats are not negatively affected by the project action that likely would lead to a resulting determination of not likely to adversely affect.

The DBNF has consulted with the USFWS on 11 timber sales since 1999, specifically; Dickerson Hollow, Road Branch, Picket, Pretty Ridge, White Sulphur Pine, Lime Kiln, Whitt Cemetery, Sexton, Hector, Bowen's Creek and Cave. All of these sales, utilizing a wide spectrum of timber harvest methods and in widely separated sites on the forest, the projects were determined to "not likely adversely affect" the Indiana bat. A USFWS letter of concurrence on these sales is part of the individual project records.

Beneficial indirect effects associated with green tree cutting activities may also occur. In the short term the increased sunlight exposure on residual trees resulting from green tree removal may improve microclimate conditions for roosting Indiana bats. Sun exposure on suitable roosting trees results in warmer roosting conditions. This is thought to be especially important for maternity colonies (MacGregor, personal communication). In the long term, timber harvest activities are designed to move the habitat of a prescription area toward its desired future condition. A discussion of the desired future condition for each prescription area on the DBNF can be found in the Revised Forest Plan. Desired future conditions are designed, in part, to maintain or enhance conditions relating to species viability. For the Indiana bat these conditions would generally include older, more open forest stands interspersed with other stands in various, younger, age classes. Overall forest conditions will range from open forest with sparse overstory of large, broad-crowned trees, to closed forest, to dense thickets of young regeneration. This mosaic of habitat conditions will continue to provide suitable roosting and foraging habitat for the Indiana bat. Specifically to the Indiana bat, the Forest Plan provides standards to protect, maintain and/or enhance Indiana bat habitat associated with timber sale projects involving green tree cutting. These standards, DB-WLD - 1 through 12 appear below:

DB-WLF-1. No snags equal to or greater than six inches in diameter at breast height (dbh) and equal to or greater than 10 feet in height are to be intentionally felled within timber harvest, regeneration and thinning projects, unless identified as an immediate threat to human safety. This standard does not apply to salvage or sanitation projects.

DB-WLF-2. Retain or create at least three snags per acre equal to or greater than 9 inches dbh within all timber harvest, regeneration, sanitation, salvage, or thinning project units when available.

DB-WLF-3. Retain enough live trees to provide partial shading of about one-third of all snags equal to or greater than 12 inches dbh and equal to or greater than 10 feet in height that are suitable for roosting by Indiana bats.

DB-WLF-4. In the two-aged shelterwood method, retain a minimum of 10 to 15 square feet of basal area per acre (average in stand) of live potential roost trees (Indiana bat).

DB-WLF-5. In harvest units equal to or greater than 10 acres that prescribe the two-age or even-age systems, leave some clumps or strips averaging at least 50 square feet of basal area (of trees equal to or greater than 9 inch dbh) per acre, or the density of the original stand if less. "Leave areas" such as the Cliffline Community and Riparian Corridor Prescription Areas can provide this habitat based on site-specific conditions.

DB-WLF-6. In regeneration or thinning project areas, retain all shagbark, shellbark, and red hickories that are (equal to or greater than 6 inch dbh), unless the removal of these trees is specifically designed to improve habitat for PETS or Conservation species.

DB-WLF-7. During implementation of vegetation management, retain any immediate roost trees (Indiana bat) that are equal to or greater than 6 inches dbh. These trees must be designated prior to project implementation. This standard does not apply to salvage or sanitation projects.

DB-WLF-8. Tree cutting may not be conducted within 2.5 miles of any Indiana bat maternity colony between May 1 and August 15.

DB-WLF-9. For non-vegetation management projects, currently suitable Indiana bat roost trees may be felled only between October 15 and March 31, if they are more than five miles from a significant bat caves (Indiana bat). If tree removal occurs at other times, the trees must be evaluated for current Indiana bat use, according to U.S. Fish and Wildlife Service protocol.

DB-WLF-10. For non-vegetation management projects, removal of currently suitable roost trees (Indiana bat) within five miles of a significant bat caves (Indiana bat), may occur only between November 16 and March 15. If removal occurs at other times, the trees must be evaluated for current Indiana bat use, according to U.S. Fish and Wildlife Service protocol.

DB-WLF-11. Timber harvest will not occur on the DBNF within one mile of a known significant bat caves, or PETS bat staging cave (with the exception of the wooded grassland/shrubland habitat association), if this activity would result in more than 120 acres of forest less than 10 years of age on all ownerships (public and private).

DB-WLF-12. Within five miles of a significant Indiana bat hibernaculum, tree cutting is not to be conducted between September 1 and December 1.

As a result of green tree harvest activities, habitat modification is not likely to directly and/or indirectly affect the availability of suitable Indiana bat roosting habitat. Over 95 percent of the DBNF acreage (663,682/693,726) is forested habitat (Revised Forest Plan EIS) and is considered to have trees suitable for Indiana bat roosting. Thus, roost trees will continue to exist on the forest and will not likely be a limiting factor anywhere on the forest. Further, within green tree harvest areas the individual trees that exhibit the most favorable characteristics for roosting (potential roost trees, 10-15 basal area/acre; all shaggy barked hickories; and all immediate roost trees) (DB_WLF 5, 7, and 8) will be

retained within timber harvest areas. Revised Forest Plan Standards are designed to minimize the potential of direct and indirect negative effects to Indiana bats. The removal of 4000 acres of trees, some of which are suitable as Indiana bat roosts should not have a detrimental affect on the overall availability of suitable trees in which Indiana bats can roost. This removal amounts to approximately ½ of one-percent of the total DBNF acreage. Abundant roosting habitat would remain on the forest. Coupled with the requirements to retain, within the sale area, those trees most likely to serve as roost sites, (potential roost trees, shaggy barked hickories and immediate roost trees) it is anticipated that roosting habitat will not be limiting to Indiana bat populations, in the short-term or long-term, on the Forest. Thus, the harvest of green trees, including some of those species that can provide suitable roosting conditions for Indiana bats, should not have a negative impact on the overall availability of suitable roosting habitat.

Harvest projects on the DBNF have been monitored for the last 4 years to determine the incidence of accidental felling of reportable roost trees.

Reportable Roost Trees are any one of the following that fall incidental to the proposed action of a project.

- 1. Snags with exfoliating bark that are 9 inch or greater dbh and at least 10-feet in height.*
- 2. All immediate roost trees 6 inches or greater dbh..*
- 3. Shaggy barked hickories (3 species) 6 inches or greater dbh.*
- 4. Any retained potential (future) roost tree which causes the desired future condition of a timber sale area to fall below the retention level of 10 to 15 square feet per acre of the appropriate tree species 9 inches or greater dbh.*

Incidentally felled trees include those resulting from the wrong trees being cut or the selected tree could, in the process of falling, accidentally knock down a tree that was not intended for felling. Other incidental felling can result from the accidental knocking down of a tree as the result of mechanical operations associated with skidding, decking or transporting of logs.

Between 2000 and 2003 the actual number of reportable roost trees felled annually on the DBNF by accident are 17, 16, 2, and 1 tree, respectively. While the chance is low, some possibility to directly and/or indirectly affect an Indiana bat does exist. Thus, the action of accidentally knocking down or accidentally cutting down a suitable roost tree when associated with green tree cutting and/or removal from the project area is considered to potentially result in take of the Indiana bat.

Through both direct and indirect effects, suitable roost trees, some of which may have roosting Indiana bats, will be felled during green tree cutting operations on the DBNF. In these project areas the best roosting trees are retained on the project site so that the overall potential to take an Indiana bat remains very small and the suitability of the area as roosting habitat is retained. Indirectly, the cutting of selected green trees may result in the accidental felling of trees not selected for removal. Some of these trees are likely to

be suitable for Indiana bat roosting. Monitoring indicates that the number of incidentally felled, suitable roost trees, is very small.

IV. Determination of Effects for the Indiana Bat

In the long-term, the overall the implementation of the Revised Forest Plan should result in improved habitat conditions for the Indiana bat through the attainment of prescription area desired future conditions. Indiana bats may be inadvertently flushed from their roosting trees by activities associated with green tree cutting activities. The probability of negatively impacting these bats, although very small, does exist as previously discussed in the analysis section.

However, the potential remains, although it is low, for Indiana bats to be harmed by the direct and indirect effects of cutting green trees and other associated actions. From a programmatic standpoint this activity may occur on as much as 4,000 acres annually on the DBNF. Therefore, the programmatic determination of effect for the cutting of green trees on the Indiana bat is **“likely to adversely affect”** primarily because of the intentional or incidental accidental felling of trees that are suitable for Indiana bat roosting.

These programmatic determinations of effect at the Forest Plan level would in no way preclude the requirement for second level, site specific analysis and consultation with the USFWS on individual projects proposed under the general direction of the Forest Plan.

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